

AMENDMENTS TO THE CLAIMS:

Please replace the claims with the following rewritten listing.

1. (Currently Amended) Method for reconstructing multidimensional objects from one- or two-dimensional image data, comprising: especially from ultrasound image data, by means of recordings (7) of

recording one- or two-dimensional partial image areas (6) of the an object (1); and
using wherein the absolute positions of the individual partial image areas (6) in space and/or the relative positions of the individual partial image areas (6) to each other are used along with the one- or two-dimensional image information (13) of the individual partial image areas (6) for generating one- or two-dimensional image data;

wherein characterized in that a first group of space elements (15a) is generated in a multidimensional voxel space (9) from first space elements (10a) which contain multidimensional image information and touch or intersect planes or lines of the partial image areas (6) by means of the one- or two-dimensional image data; and that

wherein a second group of space elements (15b) is generated in the multidimensional voxel space (9) from second space elements (10b) by means of an information transformation from the multidimensional image information of the first group of space elements (15a); and

wherein said information transformation includes at least one search beam running from each first space element along a pre-determinable multidimensional direction vector, thereby defining those second space elements determined by the multidimensional image information of that first space element which forms a starting point of the search beam.

2. (Currently Amended) Method according to claim 1, ~~characterized in that~~ wherein the multidimensional image information of each first space element (10) is determined by means of that one- or two-dimensional image information (13) which exists at the a particular interface/point of contact of the a respective first space element (10a) with the a respective plane or line of a the partial image area (6).

3. (Currently Amended) Method according to claim 1, ~~characterized in that the~~ wherein a spatial and/or chronological distance (~~x~~) from each second space element (10b) to the next first space element (10a) of the first group of space elements (15a) is determined, and ~~that the~~ multidimensional image information of each second space element (10b) is determined by ~~means of the~~ multidimensional image information of ~~the~~ a spatially and/or chronologically nearest first space element (10a).

4. (Currently Amended) Method according to claim 3, ~~characterized in that~~ wherein the multidimensional image information of each second space element (10b) ~~will is~~ is not be determined when the spatial and/or chronological distance (~~x~~) to the nearest first space element (10a) is larger than a pre-determinable maximum spatial and/or chronological distance (~~x_{max} or t_{max}~~).

5. (Currently Amended) Method according to claim 4, ~~characterized in that~~ wherein the multidimensional image information of the spatially and/or chronologically nearest first space element (10a) is used as multidimensional image information of each second space element (10b) lying within ~~the~~ a maximum spatial and/or chronological distance (~~x_{max} or t_{max}~~) to a first space element (10a).

6. (Currently Amended) Method according to claim 3, ~~characterized in that~~ wherein the spatial and/or chronological distance (~~x, t~~) and a reference number for the plane or line of the partial image area (~~6~~), ~~which was~~ used to determine the multidimensional image information of the nearest first space element (10a), is ~~also stored as~~ multidimensional image information of each second space element (10b).

7. (Currently Amended) Method according to claim 1, ~~characterized in that~~ wherein the spatial and/or chronological distances (~~x_i, t_i~~) from each second space element (10b) to two or more first space elements (10a) of the first group of space elements (15a) are determined, and ~~that the~~ multidimensional image information of each second space element (10b) is determined by ~~means of the~~ multidimensional image information of a

pre-determinable number of spatially and/or chronologically nearest first space elements (10a).

8. (Currently Amended) Method according to claim 7, ~~characterized in that~~wherein the multidimensional image information of each second space element (10b) is determined by ~~means of the multidimensional image information, weighted on the basis of the different spatial and/or chronological distances (x_i, t_i) , of a pre-determinable number of first space elements (10a).~~

9. (Cancelled)

10. (Currently Amended) Method according to claim 9~~1~~, ~~characterized in that~~wherein the search beam (14) has its a chronological and/or spatial starting point (16) on the plane or line of the partial image area (6) ~~which was used to determine the multidimensional image information of the first space element (10a), and that the search beam (14) has a maximum spatial and/or chronological length (11) along the pre-determinable multidimensional direction vector (Φ) .~~

11. (Currently Amended) Method according to claim 9~~1~~, ~~characterized in that~~wherein the second space elements (10b) are also determined by ~~means of the multidimensional image information of another first space element (10a) of the first group of space elements (15a), which constitutes a target point (19) which is hit by the search beam (14).~~

12. (Currently Amended) Method according to claim 11, ~~characterized in that~~wherein the second space elements (10b) are determined by ~~means of the~~ weighted multidimensional image information of the starting point (16) and the target point (19), wherein the weights orientate themselves at the multidimensional distances of each second space element (10b), lying on the search beam (14), to the starting or target point (16, 19).

13. (Currently Amended) Method according to claim 9~~1~~, ~~characterized in that~~wherein the second space elements (10b) are determined in a first step by means of the multidimensional image information of that first space element (10a) which forms the starting point (16) of the search beam (14), and ~~that the second space elements (10b) are weighted in further steps by means of multidimensional image information of further first space elements (10a) which form starting points (16) of search beams (14) which also penetrate the second space elements (10b), wherein the weights orientate themselves at the multidimensional distances of each second space element (10b) to the respective starting points (16, 19).~~

14. (Currently Amended) Method according to ~~th~~ claim 1, ~~characterized in that~~wherein the object (1) is reconstructed and represented multidimensionally by means of the multidimensional voxel space (9) ~~consisting of~~comprising the first and second group of space elements (15a, 15b), and/or ~~that~~ wherein parts of the reconstructed object (17) are represented by means of variable sectional planes (18).

15. (Currently Amended) Method according to claim 14, ~~characterized in that~~wherein the reconstructed object (17) or parts thereof ~~will be~~are represented or equipped with pre-determinable characteristics like colour or resistance.

16. (Currently Amended) Method according to claims 14, ~~characterized in that~~wherein certain parts of the multidimensional voxel space (9) are marked and sampled for representation on one side of an intersectional plane (18) in order to visualize certain parts of the reconstructed object (17).

17. (Currently Amended) Method according to claim 14, ~~characterized in that~~wherein the multidimensional voxel space (9) is sampled by means of an intersectional plane (18) into at least two halves (9a, 9b) to visualize certain parts of the reconstructed object (17), and ~~that~~ wherein the intersectional plane and/or the at least two halves (9a, 9b) are pivotable/ and/or rotatable and/or displaceable in different multidimensional directions.

18. (Currently Amended) Device for reconstructing multidimensional objects from one- or two-dimensional image data, ~~particularly from ultrasound image data,~~ on the basis of recordings (7) of one- or two-dimensional partial image areas (6) of the an object (1), ~~wherein comprising:~~

_____ first storage means for storing the absolute spatial and/or chronological positions of the individual partial image areas (6) and/or the relative spatial and/or chronological positions of the individual partial image areas (6) to each other along with the one- or two-dimensional image information (13) of the individual partial image areas (6) for generating one- or two-dimensional image data, ~~characterized in that:~~

_____ second storage means for storing a first group of space elements (15a) which can be generated in a multidimensional voxel space (9) from first multidimensional image information containing first space elements (10a) which touching or intersecting planes or lines of partial image areas (6) by means of the one- or two-dimensional image data; and that

_____ third storage means for storing a second group of space elements (15b) which can be generated in the multidimensional voxel space (9) from second space elements (10b) by means of an information transformation from the multidimensional image information of the first group of space elements (15a).

19. (Currently Amended) Device according to claim 18, ~~characterized in that~~ wherein the object (1) ~~can be~~ is reconstructed and represented by means of in a display by spanning the multidimensional voxel space (9) by means of the first and second group of space elements (15a, 15b).

20. (Currently Amended) Device according to claim 18, ~~characterized in that~~ wherein calculation means carry out the information transformation from the data of the first and second storage means and store the results in the third storage means.

21. (Currently Amended) ~~Use of a method~~ Method according to claim 1 ~~or a device according to claim 18 for the~~ further comprising a multidimensional reconstruction and

representation of an organ, especially the comprising a heart of a creature, considering the motion of the a heart.

22. (Currently Amended) ~~Use of a method~~ Method according to claim 1, ~~or a device according to claim 18 for the further comprising performing at least one of~~ transthoracic (TTE), transoesophagic (TEE), ~~or~~ and intravascular (IVUS) echocardiography and/or intraductal (IDUS) sonography.

23. (New) Device according to claim 18, configured for a multidimensional reconstruction and representation of an organ comprising a heart of a creature, considering the motion of the heart.

24. (New) A device according to claim 18, configured for at least one of transthoracic (TTE), transoesophagic (TEE), and intravascular (IVUS) echocardiography and/or intraductal (IDUS) sonography.